

CLAIMS

1. An audio player system comprising: a portable base unit (1) having audio data extraction means (20) for extracting digital audio data from at least one optical storage disk (6) which may be engaged in the base unit in use thereof, non-volatile memory means (22) for storing audio data extracted from said at least one optical storage disk, and data copying and transfer means (24) for copying audio data stored in said memory means and transferring said copied data to an output interface means (3) of the base unit; and a removable audio player device (2) comprising solid state memory means (10) for storing audio data thereon, and playback means (12, 21) for enabling audio data stored in said solid state memory means to be played to a user, said player device having complementary interface means (4) for interfacing with said base unit output interface means (3) whereby audio data may be transferred from the base unit (1) to the solid state memory means of the removable player device (2) and wherein the base unit (1) is provided with copy controlling means (24, 34) for limiting the number of times that data copied onto the memory means (22) thereof can be copied and transferred to the removable player device (2).

2. An audio player system according to claim 1, wherein the solid state memory means (10) of the player device is DRAM means.

3. An audio player system according to claim 1, wherein the solid state memory means (10) of the player device is FLASH memory means.

4. An audio player system according to any preceding claim, wherein the playback means of the player device (2) is formed

and arranged for playback of audio data stored in the solid state memory means (10) both while the device (2) is not interfaced with the base unit (1) and while the device (2) is interfaced with the base unit (1).

5. An audio player system according to claim 4, wherein the playback means is also formed and arranged for playback of audio data supplied directly to the playback means from the base unit (1) while the player device (2) is interfaced with the base unit.

6. An audio player system according to any preceding claim, wherein the audio data extraction means (20) of the base unit is selected from a CD drive, a CD-ROM drive and a DVD-ROM drive.

7. An audio player system according to any preceding claim, wherein the non-volatile memory means (22) comprises at least one hard disk.

8. An audio player system according to any preceding claim, wherein the copying and data transfer means comprises processor means for carrying out and controlling the copying of audio data from the memory means (22) of the base unit, and transferring the copied data to the output interface means (3).

9. An audio player system according to any preceding claim, wherein the base unit (1) includes data compression means (28) for compressing the digital audio data extracted from at least one optical storage disk (6) engaged in the base unit in use thereof, prior to storing the compressed data in the memory means (22) of the base unit.

10. An audio player system according to claim 9, wherein the data compression means comprises an MPEG Layer III encoder.

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11. An audio player system according to claim 9 or claim 10, wherein the player device (2) incorporates data decompression means (11) formed and arranged for decompressing the compressed data which is downloaded to the solid state memory means (10) of the player device (2) from the base unit (1).

12. An audio player system according to claim 11, wherein the decompression means comprises an MPEG Layer III decoder.

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13. An audio player system according to any preceding claim, wherein the playback means of the removable player device (2) includes Digital to Analogue (D/A) converter means (21) for converting stored digital data to analogue form suitable for playback to a user.

14. An audio player system according to any preceding claim, wherein the playback means of the player device includes processor means (12) for controlling operation of the player device (2) and playback of audio data.

15. An audio player system according to any preceding claim, wherein the interface means (4) of the player device is formed and arranged for receiving data downloaded thereto at at least the same rate as the rate at which data is transferred thereto by the output interface means (3) of the base unit (1).

16. An audio player system according to any preceding claim, wherein the player device (2) further includes selection means

(18) for enabling a user to select audio data to be copied to the solid state memory means from the base unit.

17. An audio player system according to any preceding claim, wherein the selection means includes user interface means (18) for enabling a user to input track identification data to a non-volatile memory means (17) provided in the player device.

18. An audio player system according to claim 17, wherein the user interface means includes visual display means (19) for displaying information to a user.

19. An audio player system according to claim 17 wherein the user interface means includes a microphone (13) for enabling a user to input track identification data to the player device.

20. An audio player system according to any of claims 17 to 19, wherein the processor means (12) of the player device is programmed to input the stored, user-entered track identification data to the base unit, when the player device is interfaced therewith, and the base unit is programmed to use the track identification data input thereto to select the track(s) to be copied to the player device from the memory means (22) of the base unit.

21. An audio player system according to claim 2, wherein the player device further includes refresh signal means (12) formed and arranged for refreshing the DRAM means after data has been downloaded thereto from the base unit so that data stored in the DRAM means is maintained therein for at least a predetermined period of time after data has been downloaded thereto.

22. An audio player system according to claim 21, wherein said data stored in the DRAM means is maintained therein for a limited period of time whereby the music copied to the player device is a temporary copy.

23. An audio player system according to any preceding claim wherein the interface means (4) of the player device comprises a standard Compact Flash slot and the output interface means (3) of the base unit comprises a complementary interface formed and arranged for inserting into said slot.

24. An audio player system according to claim 23, wherein the playback means (12, 21) is formed and arranged for enabling the player device to playback data from a standard Compact Flash card (15) which may be inserted into said slot when the player device is not being interfaced to the base unit.

25. An audio player system according to any preceding claim wherein the copy controlling means comprises the processor means (24) of the base unit, the processor means being programmed to prevent data from an optical storage disk from being copied to the player means more than a predetermined number of times unless the optical storage disk is reinserted into the base unit, and counter means (34) for enabling said predetermined number of times to be counted.

26. An audio player system according to any one of claims 1-24, wherein the copy controlling means comprises the processor means (24) of the base unit, the processor means being programmed to prevent data from an optical storage disk from being copied to the player device again until a predetermined time has passed from it last being copied, and timer means provided in the base unit for enabling said predetermined time to be measured.

27. An audio player system according to claim 26, wherein a playback time credit is stored in a non-volatile memory in the base unit, said playback time credit being an allowed amount of playback time in the player device of audio data which has been copied to the memory means of the base unit.

28. An audio player system according to claim 27, wherein the player device is provided with a non-volatile memory (17) and is configured so as to log in this non-volatile memory the amount of playback time used in the player device since a given starting time and the base unit is configured to subtract from the stored playback time credit in the base unit the playback time logged in the non-volatile memory of the player device, when the player device is interfaced into the base unit.

29. An audio player system according to claim 27 or claim 28, wherein the base unit is also configured so as to request an optical storage disk validation process to be carried out by the user when the playback time credit stored in the base unit reaches a predetermined minimum value, and to prevent further use of the base unit until the validation process has been carried out successfully.


30. A method of controlling copying of audio data from a library of audio data to an audio player, by a copying system, the method comprising controlling the number of times requested audio data can be copied from the library to the player by requiring an optical storage disk already having a copy of said requested audio data recorded thereon to be physically presented to said copying system, wherein the method comprises preventing requested audio data from being copied from the library to the player more than a

predetermined number of times unless an optical storage disk already having a copy of said requested audio data recorded thereon is physically presented to said copying system.

31. A method according to claim 30, wherein said predetermined number of times is zero.

32. A method according to claim 31, wherein an optical storage disk having a copy of said requested audio data recorded thereon is required to be physically presented to said copying system every time said requested audio data is to be copied from the library to the player.

33. A method according to claim 30, wherein an optical storage disk having a copy of said requested audio data recorded thereon is required to be physically presented to said copying system after every N times said requested audio data has been copied from the library to the player, where N is a predetermined number greater than zero, in order to allow said requested audio data to be copied from the library to the player a further N times.

 34. A method according to any one of claims 30-33, wherein the library of data is stored on at least one hard disk to which said copying system has access.

35. A method according to claim 34, wherein said copying system copies said user-requested audio data direct to said player for immediate playback.

36. A method according to claim 34, wherein said copying system copies said user-requested audio data to a memory of said player.

37. A method according to any of claims 30-36, wherein said library of audio data comprises compressed copies of audio data copied from a multiplicity of original optical storage disks having the audio data recorded thereon.

38. A method according to any of claims 30-37, wherein upon physical presentation of said optical storage disk to said copying system validation data is read from said optical storage disk by said copying system and, if the read validation data is recognised by the copying system, then the copying system allows the requested audio data to be copied to the player, but if the read validation data is not recognised by the copying system, then the copying system prevents the requested audio data being copied to the player.

39. A method according to any of claims 30-38, wherein an optical storage disk having a copy of said requested audio data recorded thereon is required to be physically presented to said copying system after a predetermined period of time has passed since the requested audio data was last copied from the library to the player, in order to allow further copying of the requested audio data to the player.

40. A method according to any of claims 30-38, wherein a predetermined amount of allowed playback time is credited to the player and after said predetermined amount of allowed playback time of the player has been used an optical storage disk having predetermined audio data recorded thereon is required to be physically presented to said copying system before any further playback time is credited to the player.